

## Features of the n-alkanes crystalline phase content in paraffin oil components and their deposits

Ibragimova D., Safiulina A., Lakhova A., Bashkirtseva N., Petrov S., Ganeeva Y.  
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

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### Abstract

High-molecular n-alkanes within high paraffin oils of remaining hard-to-recover reserves are studied. Oil paraffin hydrocarbons redistribution between oils and their heavy deposits in the downhole equipment is presented. The presence of n-alkanes in the oils asphaltenes and their deposits is shown. Asphaltenes, extracted from the oils and their asphaltene deposits, were investigated by high-temperature gas chromatography and differential scanning calorimetry, with the help of which it was succeeded to find the presence of high n-alkanes C40-C59 and higher ones in their composition judging by the crystallization temperature detected in the crystalline phase. The highest molecular weight n-alkanes, whose molecular mass distribution peak falls on C54-C58, were found in asphaltenes of oils with low paraffin wax content. The data on the crystalline phase content in oils, heavy oil deposits, asphaltene samples, isolated from oils and heavy oil deposits, as well as on the crystallization temperature are presented. High-molecular oil paraffin hydrocarbons can serve as crystallization centers of the complex structural units in oil dispersion system and flocculate at the system unbalance at achieving the critical concentration. Paraffin hydrocarbons, containing in the asphaltenes, are able to migrate and accumulate within the oil heavy deposits under certain thermodynamic conditions, as evidenced by the different compositions of n-alkanes in the oil asphaltenes and in their deposits. Different kind of the heat capacity temperature dependences is stated for oils, the presence of paraffin wax crystal phase is revealed. Comparative analysis of differential scanning calorimetry data of samples indicates contradictory dependence of the crystallization temperature and crystalline phase content on the molecular mass distribution of n-alkanes, containing in their composition, and correlates with the molecular mass distribution of solid n-alkanes in the asphaltenes, that determines the differences in the structural organization of the dispersed phase in heavy oil deposits.

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### Keywords

Asphalt-resinous substances, Crude oil disperse system, Crystallization, Paraffin, Phase transitions, Wax